

The lophialetid ceratomorph *Eoletes* (Mammalia) from the Eocene of the Zaysan Basin, Kazakstan

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Abstract.—The “hyrachyid” ceratomorph *Subhyrachyus tshakpaktasensis* Gabuniya, was named for a nearly complete skull from the Zaysan Basin of eastern Kazakstan. This skull is from the Eocene (Arshantan) Chakpaktas Formation at the Mozhevelnik locality on the Kalmakpay River. Re-examination of the skull indicates it belongs to the lophialetid genus *Eoletes* Biryukov, based on the following diagnostic features: shallow nasal incision only retracted to above the canine, long and shallow maxillary fossa, anterior edge of orbit above M2, no modifications of rostrum as in *Lophialetes*, short postcanine diastema, complete u-shaped lophoid loops on P3-4, and relatively lophodont cheek teeth. The features that distinguish *E. tshakpaktasensis* from *E. gracilis* Biryukov, (type species of *Eoletes*) and Chinese *E. xianensis* Zhang & Qi, are minor (upper cheek teeth relatively wider and more prominent premolar ectoloph ribs in *E. tshakpaktasensis*), but we retain all species as valid pending a larger sample with which to document better dental variability in *Eoletes*. *E. tshakpaktasensis* is the first record of *Eoletes* from the Zaysan Basin and extends the temporal range of the genus from the Irдинmanhan back to the Arshantan.

The Zaysan Basin of eastern Kazakstan (Fig. 1) yields an extensive fossil record of Eocene mammals that represent the Arshantan, Irдинmanhan, and Ergilian land-mammal “ages” (1ma) (e.g., Russell & Zhai 1987, Lucas et al. 2000, Lucas 2001). New discoveries in the Zaysan Basin continue to augment our knowledge of Asian Eocene mammals. Gabuniya (1999) described a new perissodactyl genus and species, *Subhyrachyus tshakpaktasensis*, from the oldest Eocene strata known in the Zaysan Basin. As the name indicates, Gabuniya considered this new taxon to be a member of the ceratomorph family Hyrachyidae and concluded that it was part of an Asian diversification of hyrachyids distinct from the well-docu-

mented North American forms, discussed by Wood (1934) and Radinsky (1965, 1967). However, reexamination of the holotype and only specimen of *Subhyrachyus tshakpaktasensis* indicates that it should be reassigned to the lophialetid genus *Eoletes*. Here we document this reassignment and briefly discuss its implications.

Abbreviations used.—When used in dental notations, uppercase letters denote upper (premaxillary and maxillary) teeth, and lowercase letters denote lower (dentary) teeth. Institutional abbreviations are: IPGAN = Institute of Paleobiology, Georgian Academy of Sciences, Tbilisi; KAN = Institute of Zoology, Academy of Sciences of the Republic of Kazakstan, Almaty.



Fig. 1. Map of Kazakhstan showing location of Zaysan Basin.

Systematic Paleontology

Family Lophialetidae Matthew & Granger, 1925

Genus *Eoletes* Biryukov, 1974

Eoletes tshakpaktasensis (Gabuniya, 1999)
Figs. 2-3

Subhyrachyus tshakpaktasensis Gabuniya, 1999:561, figs. 1-3.

Holotype.—IPGAN Z402, nearly complete skull with right P3-M3 and left P2-M3 (Gabuniya, 1999, figs. 1-3) (Figs. 2-3).

Type locality and horizon.—Mozhevel-

nik locality on the Kalmakpay River, Zaysan Basin, Kazakhstan (UTM Zone 45, 383463E, 5256668N, datum WGS84).

Referred specimen.—Only known from the holotype.

Description.—Gabuniya (1999) provided a detailed and accurate description of IPGAN Z402, obviating the need for extensive description here. Instead, we list the salient features critical to determining the systematic position of this fossil below.

The nasal incision is very shallow, only retracted to above the canine:

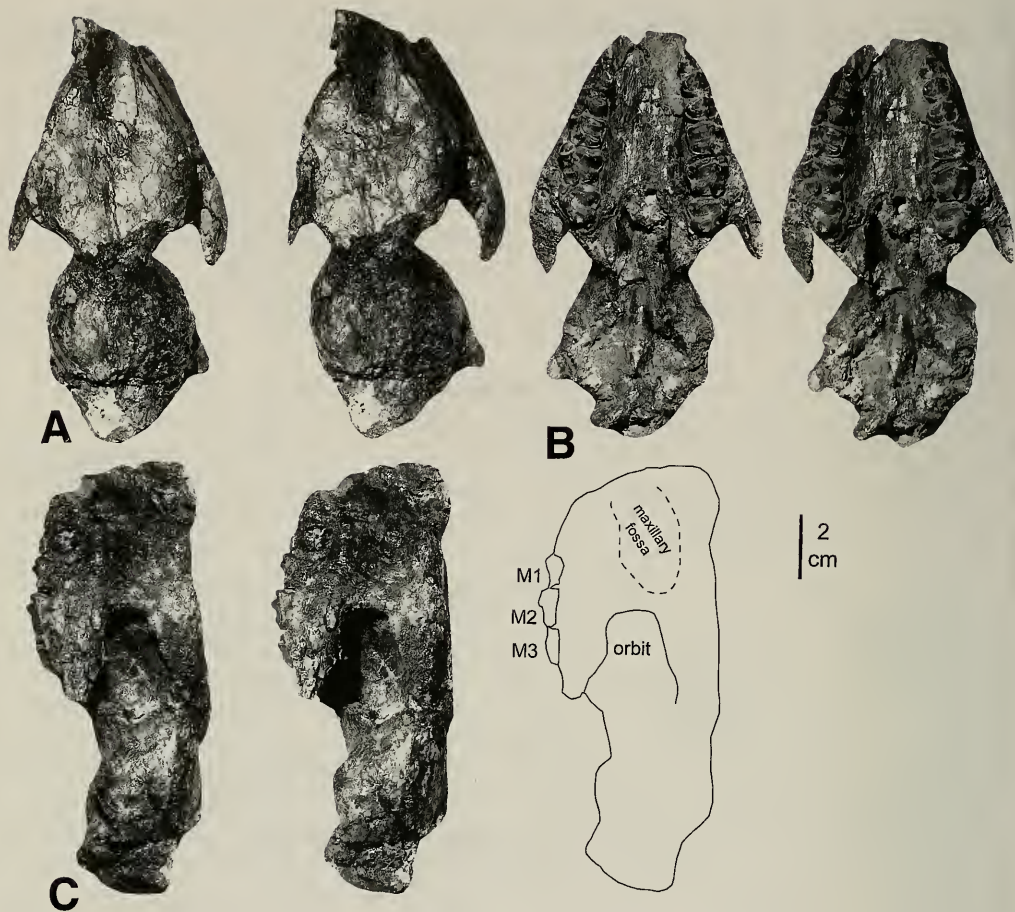


Fig. 2. IPGAN Z402, skull of *Eoletes tschakpaktasensis* in dorsal (A; stereophotos), ventral (B; stereophotos), and left lateral (C; stereophotos) views.

The facial portion of the maxilla bears a moderately deep preorbital fossa:

The nasals extend far anteriorly and apparently contact the premaxilla:

The supraorbital processes are damaged, so that their complete extent cannot be determined:

The P3 and P4 each bear a protoloph and metaloph that are joined lingually, forming a U-shaped loop. This is the “complete lophoid loop” character of Hooker (1989, p. 88, table 6.1, character 21):

The upper cheek teeth are relatively lophodont, with prominent, sharp ectolophs, prominent molar parastyles, lingually deflected molar metacones, and sharp, well-developed molar protolophs and metalophs

connecting the lingual cusps to the ectoloph:

Measurements of the cheek teeth of IPGAN Z402 (in mm) are: P2 L = 8.8, W = 8.6; P3 L = 9.4, W = 10.4; P4 L = 9.5, W = 11.4; M1 L = 12.3, W = 14.1; M2 L = 14.6, W = 15.5; M3 L = 13.9, W = 14.7:

Discussion—The U-shaped lophs of the premolars are a synapomorphy of the Lophialetidae (Hooker 1989, Lucas et al. 1997) and indicate that IPGAN Z402 is a lophialetid. In hyrachyids, the premolar metalophs are short and do not contact the protoloph. Lophialetids include the genera *Lophialetes*, *Schlosseria*, *Breviodon*, and *Eoletes*. *Lophi-*



Fig. 3. Occlusal views of upper cheek teeth of *Eoletes*. A, IPGAN Z402, *Eoletes tshakpaktasensis*, right P2-M3. B) KAN 5088/69, *Eoletes gracilis*, left P1-M3 (photo reversed).

alates differs from the others in possessing a narial incision that is retracted far posteriorly, similar to what is seen in living *Tapirus*. IPGAN Z402 is similar to many primitive perissodactyls, including *Hyrachyus* and lophialetids other than *Lophialetes* and *Schlosseria*, in possessing an unretracted narial incision. Among lophialetids without a retracted narial incision, only *Eoletes* possesses a well-developed maxillary fossa (Lucas et al. 1997). *Eoletes* also possesses a long supraorbital process.

The morphology of the premolars indicates that IPGAN Z402 is a lophialetid, not a hyrachyid. The absence of a retracted narial incision indicates that this specimen does not belong to *Lophialetes* or *Schlosseria*. IPGAN Z402 is very similar in its cranial morphology to specimens of *Eoletes gracilis* from the Shinzaly locality in eastern Kazakhstan, particularly in terms of the morphology of the preorbital fossa and dentition (Biryukov 1974, Reshetov 1979, Lucas et al. 1997, figs. 3–4). Unfortunately, the poor preservation of the supraorbital processes prevents any assessment of

whether IPGAN Z402 is similar to the Shinzaly specimens of *Eoletes* in this feature. Nevertheless, we feel that the similarities between these specimens justify assigning IPGAN Z402 to *Eoletes*.

IPGAN Z402 does differ from described species of *Eoletes* (*E. gracilis* and *E. xianensis* Zhang & Qi, 1981) in some minor features. Thus, IPGAN Z402 has relatively wider cheek teeth, more prominent ectoloph ribs on the upper premolars, and relatively larger upper molar parastyles than other specimens of *Eoletes*. Because little is known of dental variation in *Eoletes*, it is difficult to evaluate the taxonomic significance of these differences. Although we suspect that these differences may be found in the future to fall within the range of intraspecific variation for this taxon, we take the conservative course and tentatively retain Gabuniya's species, and we refer IPGAN Z402 to *Eoletes tshakpaktasensis*.

Biostratigraphy

The holotype of *E. tshakpaktasensis* is the first record of *Eoletes* from the Zaysan

Basin and is the oldest record of the genus. It is derived from the Chakpaktas svita, which is of Arshantan age (Lucas 2001). The type locality and only record of *E. gracilis*, at Shinzaly, is younger, of Irdinmanhan age (Lucas et al. 1997, Lucas 2001). The only occurrence of *E. xianensis* in the Bailuyuan Formation of Shaanxi is Irdinmanhan or possibly slightly younger (Lucas et al. 1997). *Eoletes* thus remains a rare tapiroid from the Eocene (Arshantan-Irdinmanhan) of Asia.

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